The BL20 Solution

The BL20 modular concept is a very flexible approach to terminal-wired I/O. The gateway, base and electronic modules provide many benefits to the user.

- The gateway provides communication between the fieldbus and I/O modules; modules are not dependent on the fieldbus protocol.
- DIN-rail mountable base modules are available with different wiring configurations to suit the user's needs.
- Electronic modules are hot swappable.
- Power distribution modules can be used to create isolated power segments within the system.

BL20's openness and flexibility provide a viable alternative to traditional PLC I/O.

Maximum Size of a BL20 Station

BL20 stations consist of a gateway and a maximum of 74 I/O modules (equivalent to 1 m station length). Some high-tech and analog I/O modules may consume or produce large amounts of data, and therefore may further limit the number of modules that may be used. It is highly recommended that I/Oassistant software is used when planning and commissioning BL20 systems. This program allows you to build the BL20 node on your computer and verify that all restrictions with regard to power and size are met. The free I/Oassistant software is available to download from TURCK website.

Addressing

As a node on a network, the BL20 station must have an address. The setting of this address is dependent on the network system being used. Each network gateway has a set of rotary switches (one for the most significant digit, or 10's multiplier, and one for the least significant digit, or 1's multiplier) that are used to set the address for the node. DeviceNet™ gateways may be addressed between 0 and 63, while PROFIBUS®-DP and CANopen gateways can be set from 0 to 99.

BL20 Power Distribution

The power supply for a BL20 station is fed via power feeding or bus refreshing modules; the latter also being responsible for the power supply to the internal module bus. Bus refreshing modules are used within a BL20 station (without gateway supply) if the system supply to the BL20 modules (nominal current IMB 1.5 A) is no longer sufficiently guaranteed. Bus refreshing modules are used with tension clamp (BL20-P3T-SBB-B or BL20-P4T-SBBC-B) or screw connection base modules (BL20-P3S-SBB-B or BL20-P4S-SBBC-B). Power feeding modules are used if the system supply to the BL20 modules (nominal current IL < 10 A) is no longer sufficiently guaranteed.

System Supply Via Module Bus

The amount of BL20 modules that may be supplied by a bus refreshing module via the internal module bus depends on the respective minimal current IMB of the individual modules on the bus. The sum of the nominal current inputs of the connected BL20 modules must not exceed 1.5 A. BL20 gateway power requirements (supplied by the first bus refreshing module) should be considered when calculating the required number of bus refreshing modules. If I/Oassistant software is used, an error message is generated automatically via the <Station - Verify> as soon as the system supply is no longer sufficiently guaranteed.
All bus refreshing modules used in a BL20 station should be connected via the same frame potential. The power supply to the bus is fed via the connections 11 (plus) and 21 (ground) of the respective base module for the bus refreshing module.

Creating Potential Groups

Both bus refreshing modules and power feeding modules may be used to create a potential group. The base module creates the possible isolation of the potential group on the left-hand side of the respective power distribution module.

It is not permitted for modules with 24 VDC and with 120/230 VAC field supply to be used in a joint potential group. Therefore, when using digital input modules for 120/230 VAC, the power feeding module BL20-PF-120/230VAC-D is to be used to create a special potential group.

C-rail (Cross Connection)

C-rails run through all I/O base modules. The C-rail for base modules for power distribution is mechanically separated; thus potentially isolating the adjoining supply groups.

Access to the C-rail

Access to the C-rail is made via base modules with a C designation (i.e. BL20-S4T-SBCS). The corresponding connection level is indicated by a thick black line on all base modules for BL20 I/O modules. For base modules for power distribution, the black line is only above the connection “24" to indicate that the C-rail is separated from the adjoining potential group to its left.

It is permitted to load the C-rail with a maximum of 24 V; never with 120/230 VAC.

Using the C-rail with Relay Modules

The C-rail may be used to supply a common voltage when relay modules are used. To accomplish this, the load voltage (24 VDC) is connected to a power distribution module and the base module BL20-P4x-SBBC with either tension clamp or screw connections.

If the C-rail is used for the joint supply of voltage to relay modules, there must be a power distribution module used for the potential isolation of the BL20 modules. The C-rail may still be used as protective earth (PE) once the potential isolation has been made.

Using the C-rail as a Protective Earth

A C-rail may be used as a protective earth (PE), where the PE connection for each power distribution modules must be connected to the mounting rail via an additional PE terminal, which is available as an accessory.

Environmental Conditions

General Technical Data	
Potential isolations	Via Optocoupler
Ambient temperature	
Operating temperature	+32 to +131°F (0 to +55°C)
Storage temperature	-13 to +185°F (-25 to +85°C
Relative humidity	5 to 95% (indoor), Level RH-2, without condensation (storage at 45°C)
Noxious gas	
SO2	10 ppm (rel. humidity <75%, without condensation)
H2S	1.0 ppm (rel. humidity <75%, without condensation)
Resistant to vibration	According to EN 61131
Operating conditions	According to EN 61131
Resistant to shock	According to IEC 68-2-27
Resistant to repetitive shock	According to IEC 68-2-29
Topple and fall	According to IEC 68-2-31 and free fall according to IEC 68-2-32
Protection class	IP 20
Electromagnetic compatibility (EMC)	According to EN 50 082-2 (Industry)
Tests	According to EN 61131-2
Base Modules	
Measurement data	According to VDE 0611 part 1/8.92 / IEC 947-7-1/1989
Connection to technology in TOP construction	Tension clamp or screw connection
Insulation stripping length	8 mm
Crimpable wire	
Nominal diameter	1.5 mm^2
“e” solid core H 07V-U	0.5 to 2.5 mm^2
“f” flexible core H 07V-K	0.5 to 1.5 mm^2
“f” with ferrules according to DIN 46 228/1 (ferrules crimped gas-tight)	0.5 to 1.5 mm^2
Plug gauge according to IEC 947-1/1988	A1
Protection class	IP 20
Approvals	CE
	UL
	CSA

BL20

DeviceNet Gateway

BL20-GWBR-DNET

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <250 mA from BR power supply
- Supply Current: <10 A to I/O (from U_L)
  <1.5 A to backplane (from U_{SYS})

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20
- Vibration: 1 g @ 5-100 Hz

Material

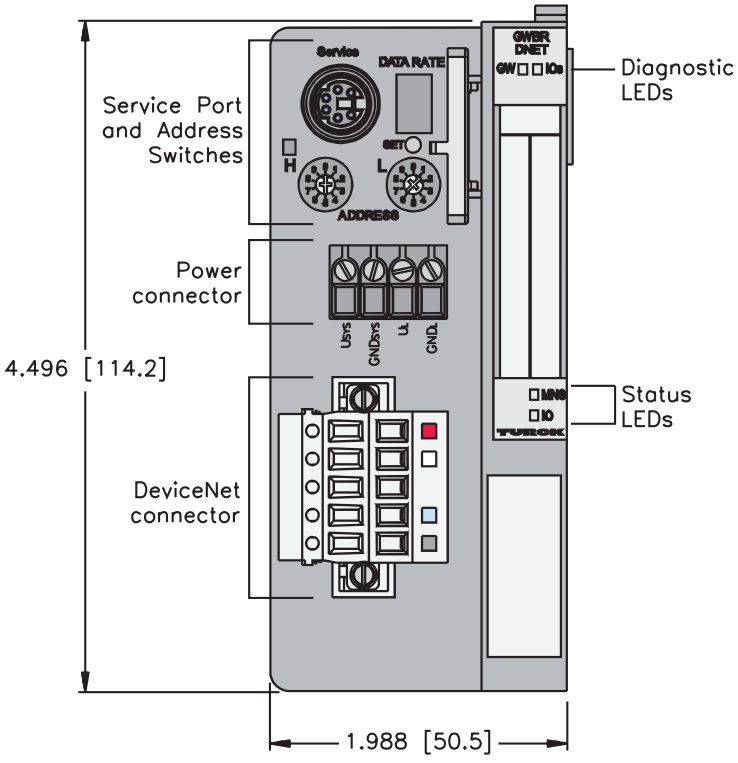
- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

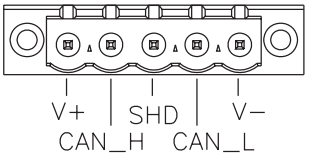
- Diagnostic information available through the DeviceNet I/O map

Diagnostics (Physical)

- LEDs to indicate status of DeviceNet and Module Bus communication

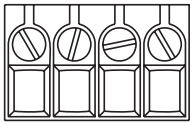


DeviceNet Connector



Power Connection

1 = U_{SYS}
2 = Gnd_{SYS}
3 = U_L
4 = Gnd_L



PROFIBUS-DP Gateway

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <430 mA from BR power supply (U_{SYS})
- Supply Current: <10 A to I/O (from U_L)
  <1.5 A to backplane (from U_{SYS})

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20
- Vibration: 1 g @ 5-100 Hz

Material

- Housing: PC-V0 (Lexan)

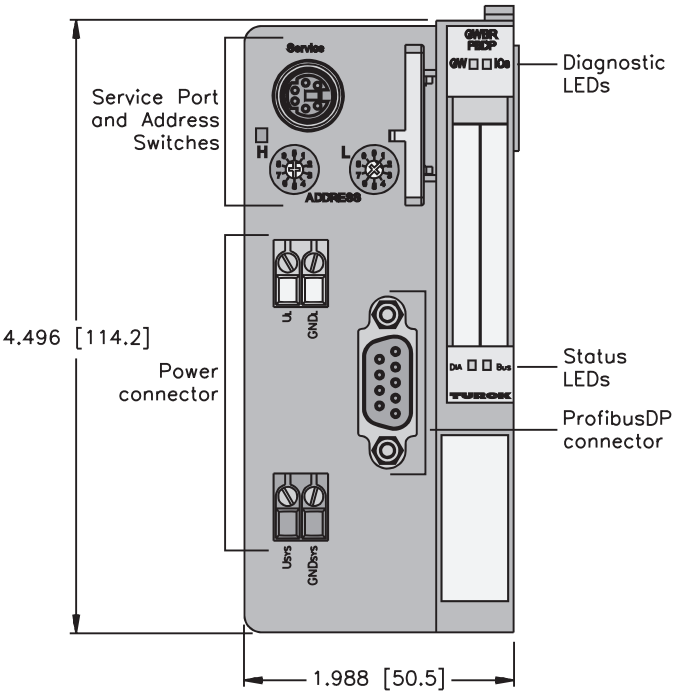
Diagnostics (Logical)

- Diagnostic information available through the PROFIBUS-DP interface

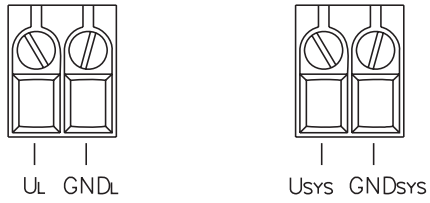
Diagnostics (Physical)

- LEDs to indicate status of PROFIBUS-DP and Module Bus communication

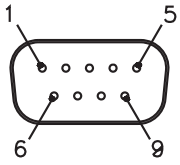
BL20-GW-DPV1



Power Connectors



PROFIBUS-DP Connector



1 = Shield
3 = BUS_B
5 = DGnd
6 = +5 VDC
8 = BUS_A

BL20

Ethernet Gateway

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <430 mA from BR power supply (U_{SYS})
- Supply Current: <10 A to I/O (from U_L)
  <1.5 A to backplane (from U_{SYS})

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20
- Vibration: 1 g @ 5-100 Hz

Material

- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

- Diagnostic information available through the PROFIBUS-DP interface

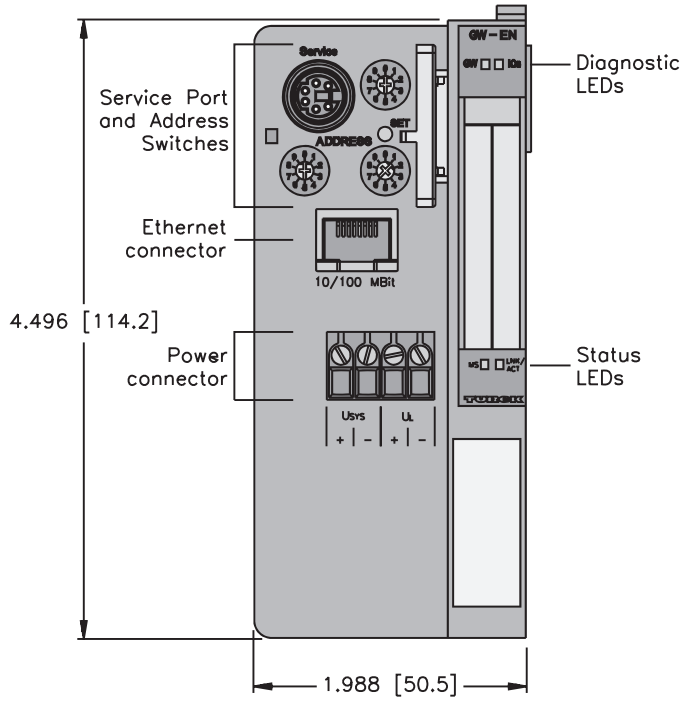
Diagnostics (Physical)

- LEDs to indicate status of PROFIBUS-DP and Module Bus communication

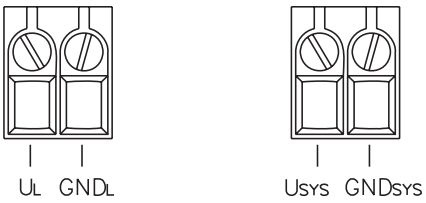
Programmability

- PG in part number designates a programmable gateway
- Progammable according to IEC 61131.3 using CodeSys (includes ladder logic)
- Use CodeSys to create logic programs to control local I/O

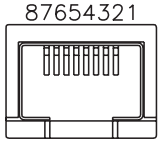
BL20-GW-EN
BL20-PG-EN



Power Connectors



RJ45 Ethernet Standard



1 = WH/or (+TX)
2 = OR (-TX)
3 = WH/GN (+RX)
4 = BU
5 = WH/BU
6 = GN (-RX)
7 = WH/BN
8 = BN

Ethernet Gateway

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <430 mA from BR power supply (U_{SYS})
- Supply Current: <10 A to I/O (from U_L)
  <1.5 A to backplane (from U_{SYS})

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20
- Vibration: 1 g @ 5-100 Hz

Material

- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

- Diagnostic information available through the PROFIBUS-DP interface

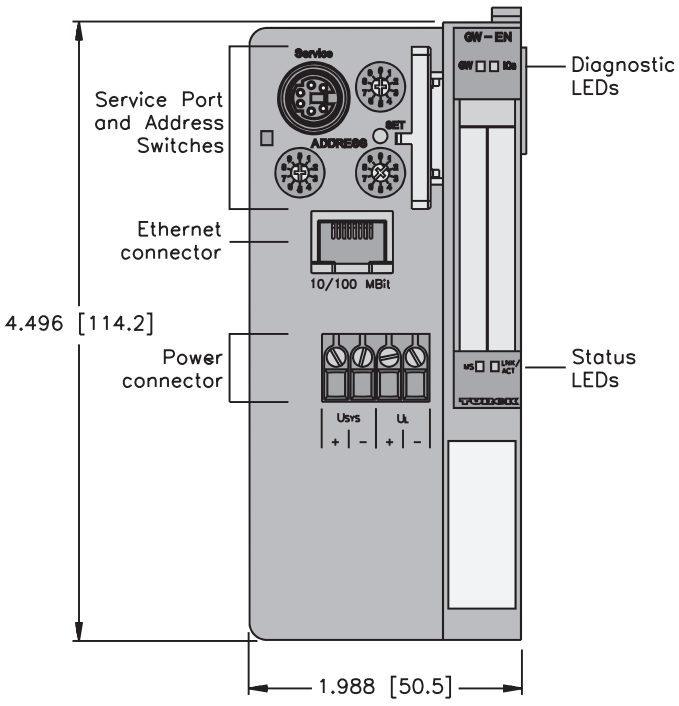
Diagnostics (Physical)

- LEDs to indicate status of PROFIBUS-DP and Module Bus communication

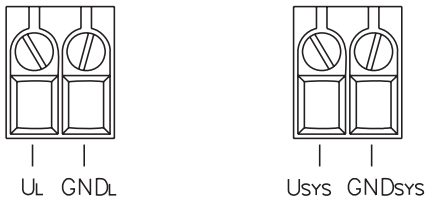
Programmability

- PG in part number designates a programmable gateway
- Progammable according to IEC 61131.3 using CodeSys (includes ladder logic)
- Use CodeSys to create logic programs to control local I/O

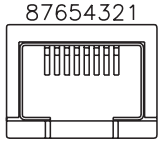
BL20-GW-EN-IP
BL20-PG-EN-IP



Power Connectors



RJ45 Ethernet Standard



1 = WH/or (+TX)
2 = OR (-TX)
3 = WH/GN (+RX)
4 = BU
5 = WH/BU
6 = GN (-RX)
7 = WH/BN
8 = BN

BL20

CANopen Gateway

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

BL20-GWBR-CANOPEN

Electrical

- Operating Current: <350 mA from BR power supply (U_{SYS})
- Supply Current: <10 A to I/O (from U_L)
  <1.5 A to backplane (from U_{SYS})

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20
- Vibration: 1 g @ 5-100 Hz

Material

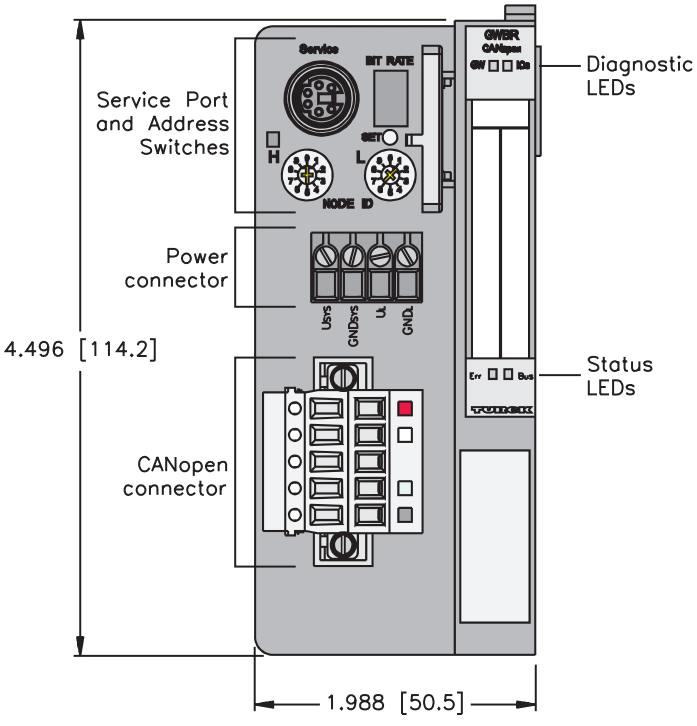
- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

- Diagnostic information available through the CANopen interface

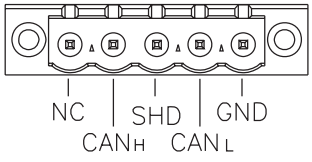
Diagnostics (Physical)

- LEDs to indicate status of CANopen and Module Bus communication



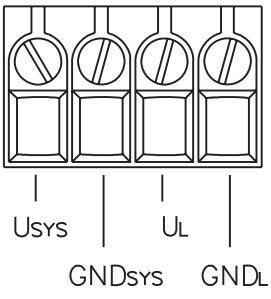
CANopen Connector

1 = NC
2 = CAN_H
3 = Shield
4 = CAN_L
5 = Gnd



Power connector

1 = U_L+
2 = V_L-
3 = U_{SYS}+
4 = U_{SYS}-



Discrete Input Modules

BL20-2DI-24VDC-N
BL20-2DI-24VDC-P
BL20-4DI-24VDC-N
BL20-4DI-24VDC-P (shown)

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <28 mA from V_{MB}
  <20 mA from V_{IO} (...-2DI...)
  <40 mA from V_{IO} (...-4DI...)

Power Distribution

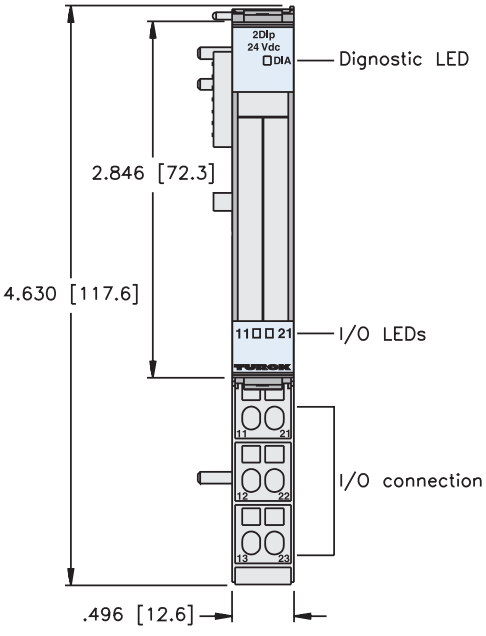
- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

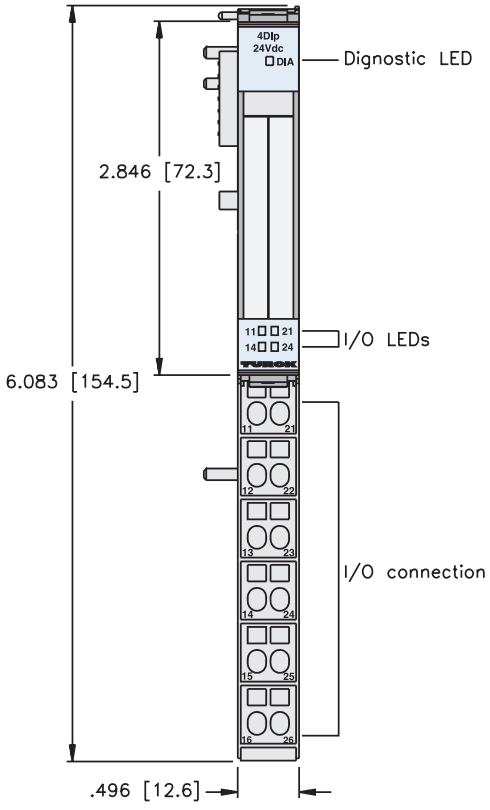
Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



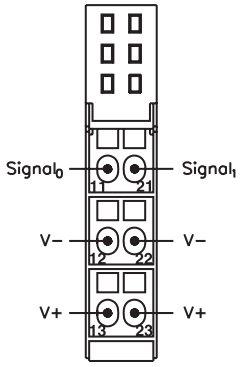


	Inputs						Data
Part Number	Input Count	Pinout	Style	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-2DI-24VDC-P with BL20-S3*-SBB**	2	B20-3A	PNP				1
BL20-2DI-24VDC-N with BL20-S3*-SBB**	2	B20-3A	NPN				1
BL20-4DI-24VDC-P with BL20-S6*-SBBSBB**	4	B20-6A	PNP				2
BL20-4DI-24VDC-N with BL20-S6*-SBBSBB**	4	B20-6A	NPN				2

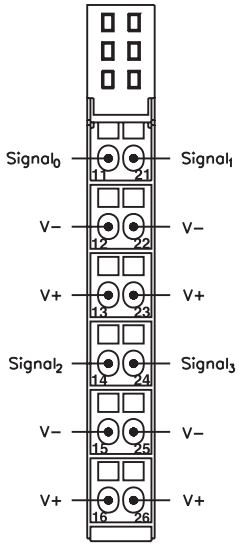
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See page C58 - C61.

Input Connectors

B20-3A



B20-6A



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Data from next discrete modules						I-1	I-0
	n+1	(Data from modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Data from next discrete modules				I-3	I-2	I-1	I-0
	n+1	(Data from modules to the right)							

Discrete Input Economy Module

BL20-E-8DI-24VDC-P
BL20-E-16DI-24VDC-P

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Base and Electronics in One Part**

Electrical

- Operating Current: <30 mA from V_{MB}
  <2 mA from V_{IO}

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

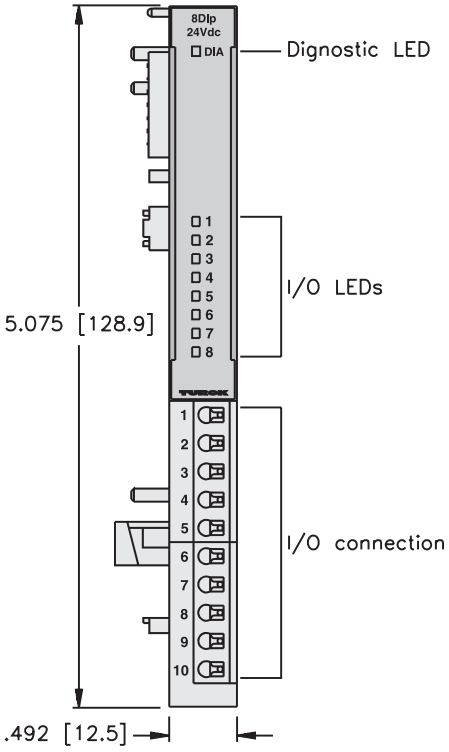
Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

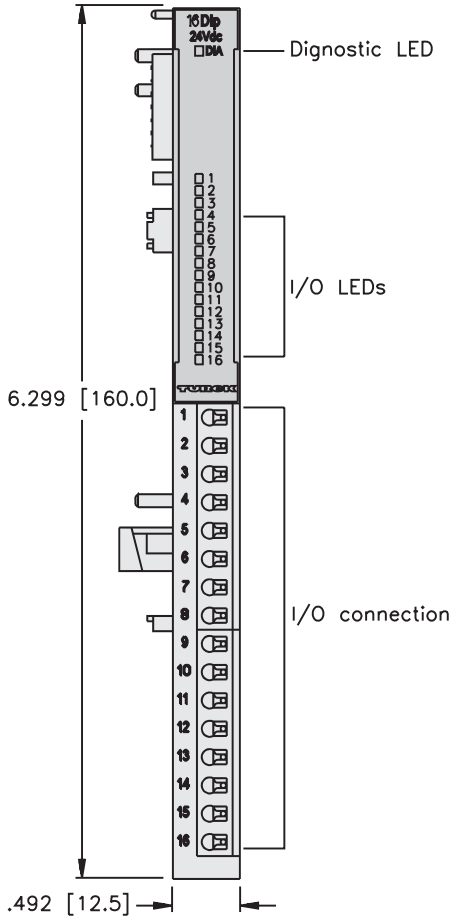
Diagnostics

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

8DI..



16DI..

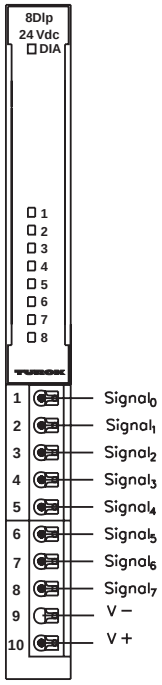


	Inputs						Data
Part Number	Count	Pinout	Style	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-E-8DI-24VDC-P	8	B20-E1	PNP				1
BL20-E-16DI-24VDC-P	16	B20-E2	PNP				2

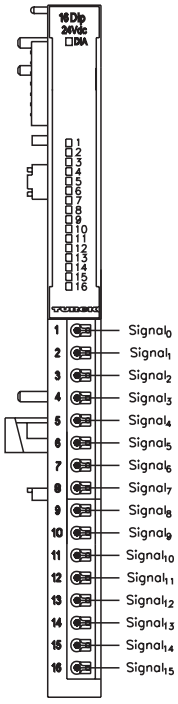
Note: This module can only be used with other tension clamp modules.

Input Connectors

B20-E1



B20-E2



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
	n+1	(Data from modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
	n+1	I-8	I-9	I-10	I-11	I-12	I-13	I-14	I-15
	n+2	(Data from right)							

NAMUR Input Module

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **NAMUR Inputs**

BL20-4DI-NAMUR

CE

Electrical

- Operating Current: <40 mA from V_{MB}
  <30 mA from V_{IO}

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

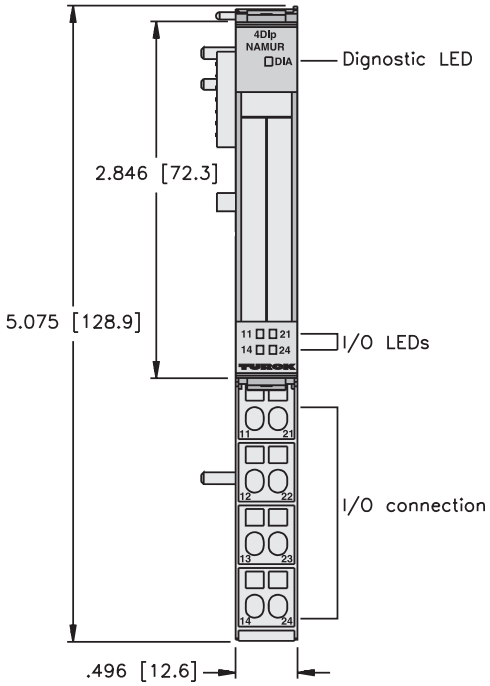
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

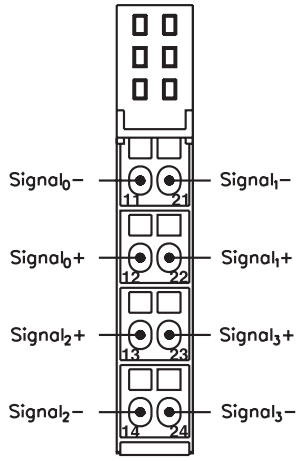


Part Number	Inputs: Input Count	Inputs: Pinout	Inputs: Style	Inputs: Group Diagnostics	Inputs: Individual Diagnostics	Inputs: Wire-Break Detection	Data: I/O Map
BL20-4DI-NAMUR with BL20-S4*-SBBS**	4	B20-4C	NAMUR		X		1

* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See page C58 - C61.

Input Connectors

B20-4C



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	S-3	S-2	S-1	S-0	I-3	I-2	I-1	I-0
	n+1	(Data from modules to the right)							

Note: S = status bit

Discrete DC Output Modules

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

BL20-2DO-24VDC-2A-P
BL20-2DO-24VDC-0.5A-N
BL20-2DO-24VDC-0.5A-P
BL20-4DO-24VDC-0.5A-P

Electrical

- Operating Current: <33 mA from V_{MB}
  <25 mA from V_{IO} (...-0.5A...)
  <50 mA from V_{IO} (...-2A...)
- Output Current: see table on facing page (from V_{IO})

Power Distribution

- Outputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

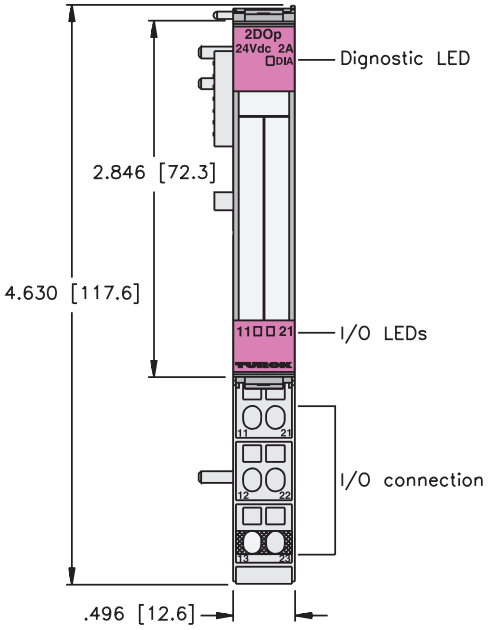
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

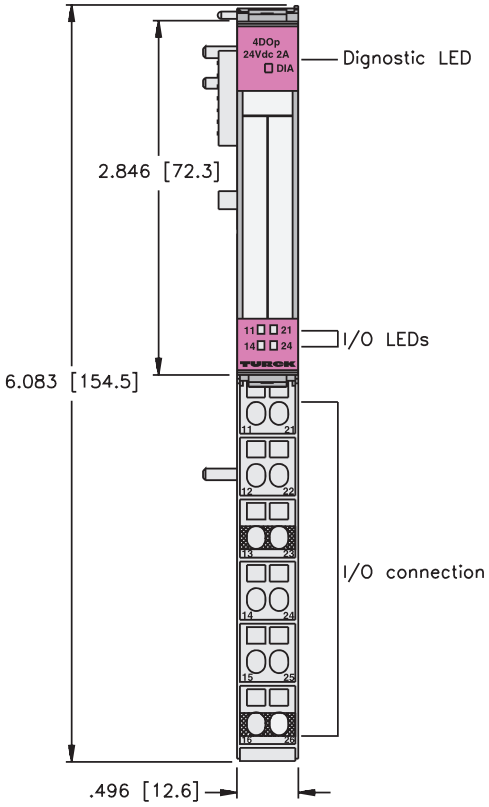
Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



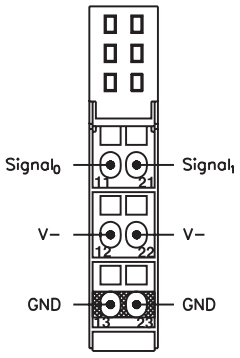


Part Number	Outputs: Input Count	Outputs: Pinout	Outputs: Current	Outputs: Individual Diagnostics	Outputs: Wire-Break Detection	Data: I/O Map
BL20-2DO-24VDC-0.5A-P with BL20-S3*-SBC**	4	B20-3B	0.5 A			1
BL20-2DO-24VDC-0.5A-N with BL20-S3*-SBC**	4	B20-3B	0.5 A			1
BL20-2DO-24VDC-2A-P with BL20-S3*-SBC**	4	B20-3B	2 A			1
BL20-4DO-24VDC-0.5A-P with BL20-S6*-SBCSBC**	4	B20-6B	0.5 A			2

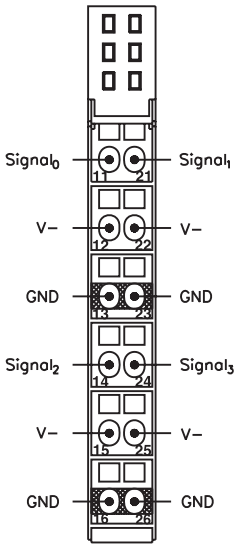
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See page C58 - C61.

Output Connectors

B20-3B



B20-6B



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Data for next discrete modules						0-1	0-0
	n+1	(Data for modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Data for next discrete modules					0-3	0-2	0-1	0-0
	n+1	(Data for modules to the right)							

Discrete Output Economy Module

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Base and Electronics in One Part**

BL20-E-8DO-24VDC-0.5A-P
BL20-E-16DO-24VDC-0.5A-P

Electrical

- Operating Current: <30 mA from V_{MB}
  <10 mA from V_{IO}
- Output Current: <0.5 A per output (from V_{IO})

Power Distribution

- Outputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

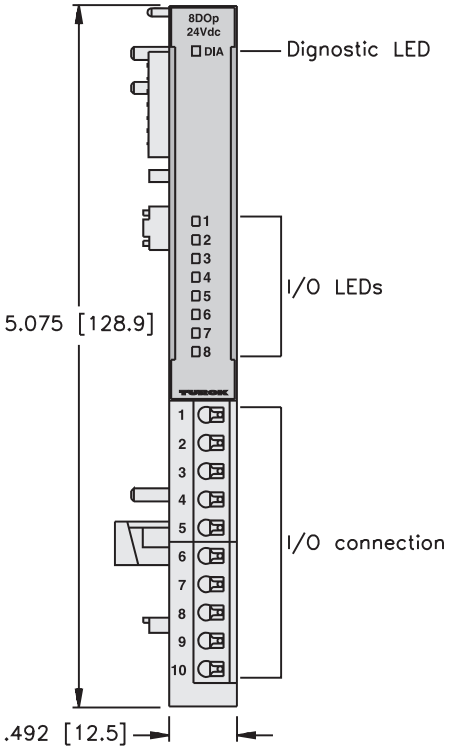
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

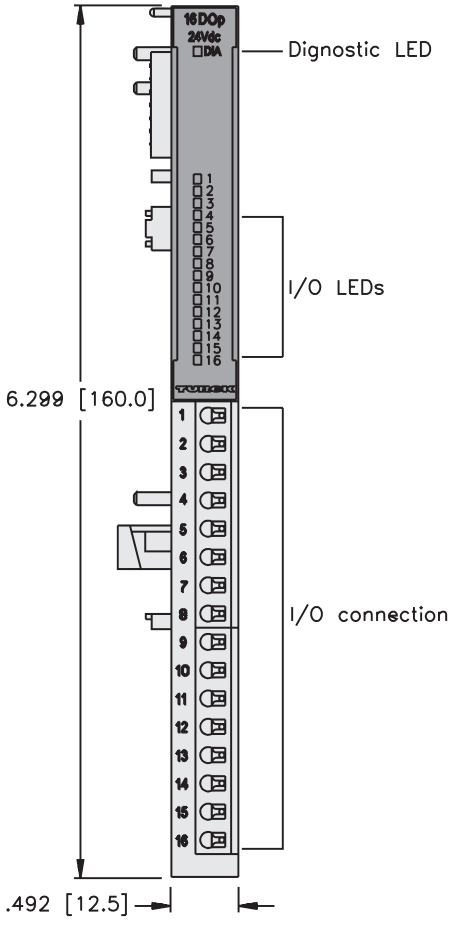
Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status





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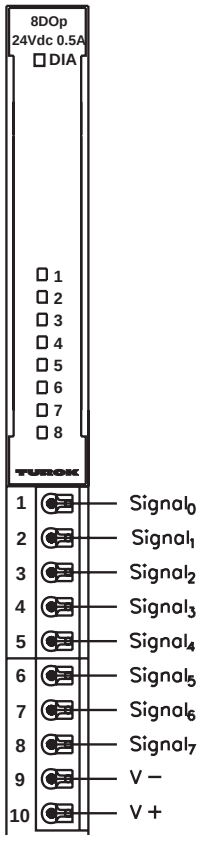
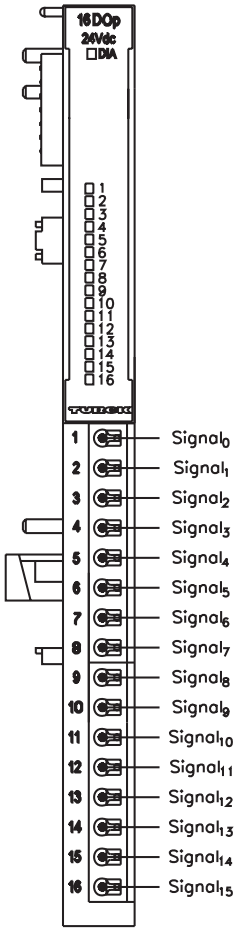
Part Number	Outputs: Input Count	Outputs: Pinout	Outputs: Current	Outputs: Individual Diagnostics	Outputs: Wire-Break Detection	Data: I/O Map
BL20-E-8DO-24VDC-0.5A-P	8	BO-E1	0.5 A	X		1
BL20-E-16DO-24VDC-0.5A-P	16	BO-E2	0.5 A	X		2

Output Connectors

BO-E1



BO-E2



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	0-7	0-6	0-5	0-4	0-3	0-2	0-1	0-0
	n+1	(Data for modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	0-7	0-6	0-5	0-4	0-3	0-2	0-1	0-0
	n+1	0-8	0-9	0-10	0-11	0-12	0-13	0-14	0-15
	n+2	(Data from right)							

Discrete relay Output Modules

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Relay Outputs**

BL20-2DO-R-CO
BL20-2DO-R-NO
BL20-2DO-R-NC

Electrical

- Operating Current: <28 mA from V_{MB}
  <20 mA from V_{IO}

Power Distribution

- Outputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

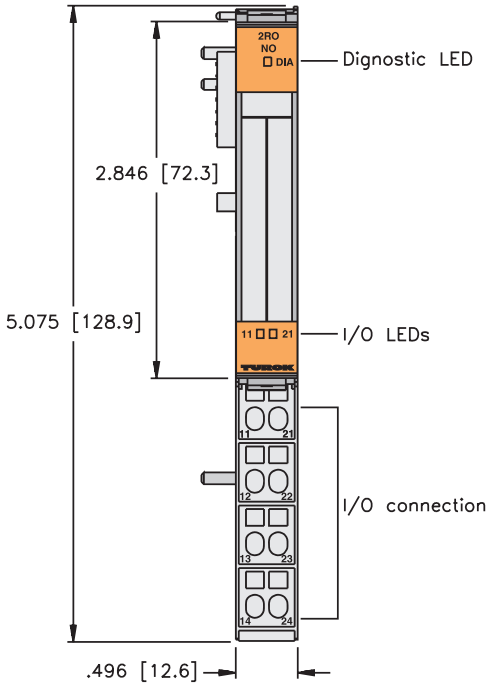
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

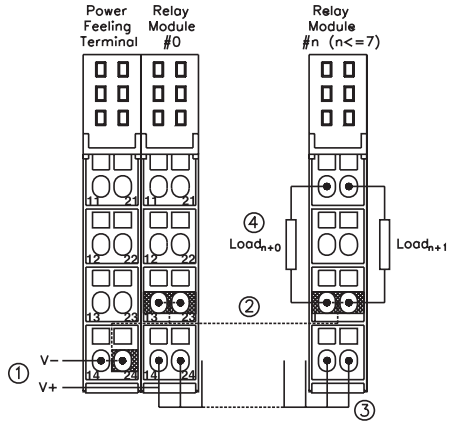


Part Number	Outputs: Count	Outputs: Pinout	Outputs: Current	Outputs: Individual Diagnostics	Outputs: Wire-Break Detection	Data: I/O Map
BL20-2DO-R-NO with BL20-S4*-SBCS**	2	B20-4A	2 A			1
BL20-2DO-R-NC with BL20-S4*-SBCS**	2	B20-4A	2 A			1
BL20-2DO-R-CO with BL20-S4*-SBBS**	2	B20-4B	2 A			1

* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Output Connectors

B20-4A



① Power is supplied by the user.

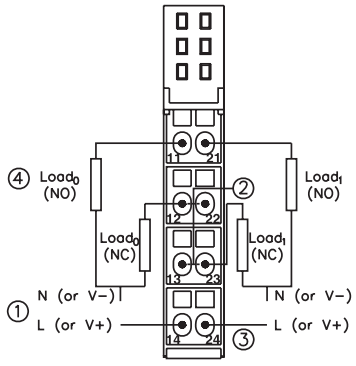
② V– terminal points connected internally via "C–Rail"

③ V+ terminal points connected externally by user (jumper part number XN–QV/*, "*" indicates number of slices to connect, up to 8)

④ Relay$_0$ contact is between terminals 14/11
Relay$_1$ contact is between terminals 24/21

*NOTE: C–Rail scheme may only be used with 24 VDC relays. Not rated for AC use.

B20-4B



① Power is supplied externally by the user.

② Terminal points 12/22 connected internally.
Points 13/23 connected internally.

③ Terminal points 14/24 may be connected externally by user (jumper part number XN–QV/1).

④ Relay$_0$ (NO) contact is between terminals 14/11, (NC) contact between 24/21.
Relay$_1$ (NO) contact is between terminals 24/21, (NC) between 24/23.

I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Data for next discrete modules						0-1	0-0
	n+1	(Data for modules to the right)							

Discrete AC Input Module

BL20-2DI-120/230VAC-P

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **AC Inputs**

Electrical

- Operating Current: <28 mA (from V_{MB})
  <20 mA (from V_{IO})

Power Distribution

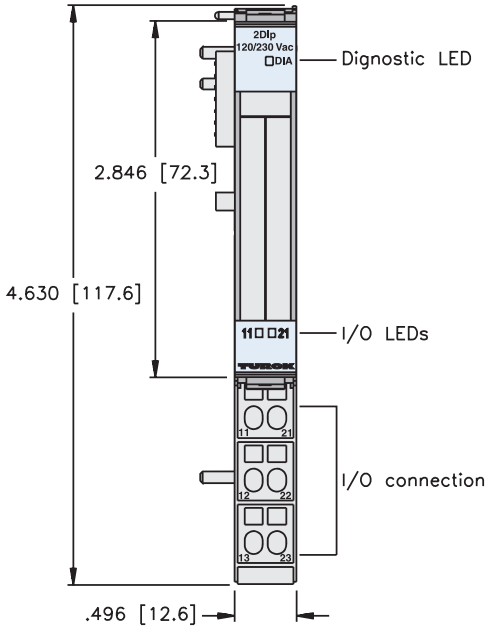
- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



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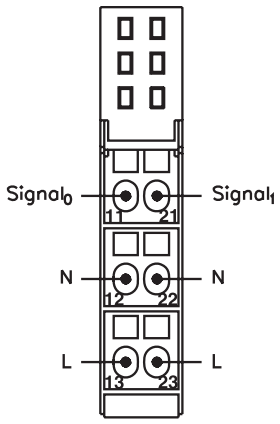
Part Number	Inputs						Data
	Input Count	Pinout	Style	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-2DI-120/230VAC-P with BL20-S3*-SBB**	2	B20-3C	AC				1

* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-3C



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Data from next discrete modules						I-1	I-0
	n+1	(Data from modules to the right)							

Discrete AC Output Module

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **AC Outputs**

BL20-2DO-120/230VAC-0.5A

Electrical

- Operating Current: <35 mA from V_{MB}
  <20 mA from V_{IO}
- Output Current: <0.5 A per output (from V_{IO})

Power Distribution

- Outputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

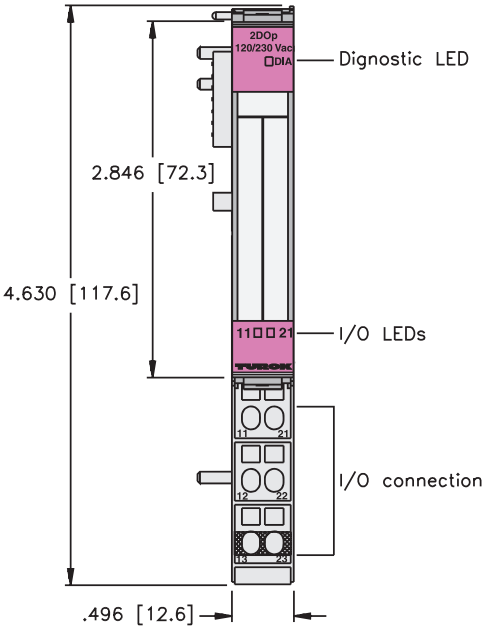
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



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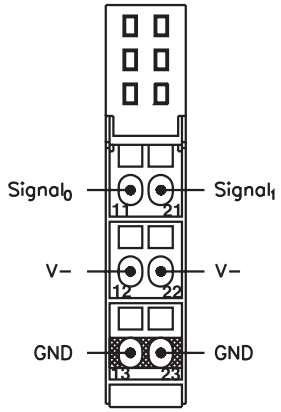
Part Number	Outputs						Data
	Output Count	Pinout	Current	Individual Diagnostics	Wire-Break Detection	I/O Map	
BL20-2DO-120/230VAC-0.5A-P with BL20-S3*-SBC**	2	B20-3B	0.5 A			1	

* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Output Connectors

B20-3B



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Data for next discrete modules						0-1	0-0
	n+1	(Data for modules to the right)							

Discrete Input Blocks

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

BL20-32DI-24VDC-P
BL20-16DI-24VDC-P

Electrical

- Operating Current: <45 mA from V_{MB}
  <40 mA from V_{IO} (...-16DI...)
  <30 mA from V_{IO} (...-32DI...)

Power Distribution

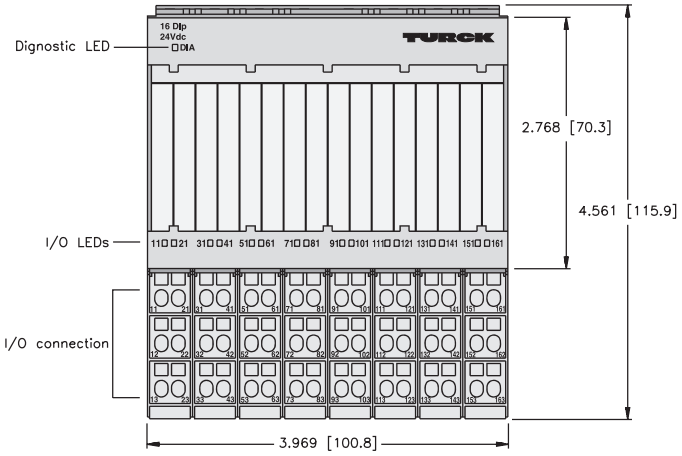
- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

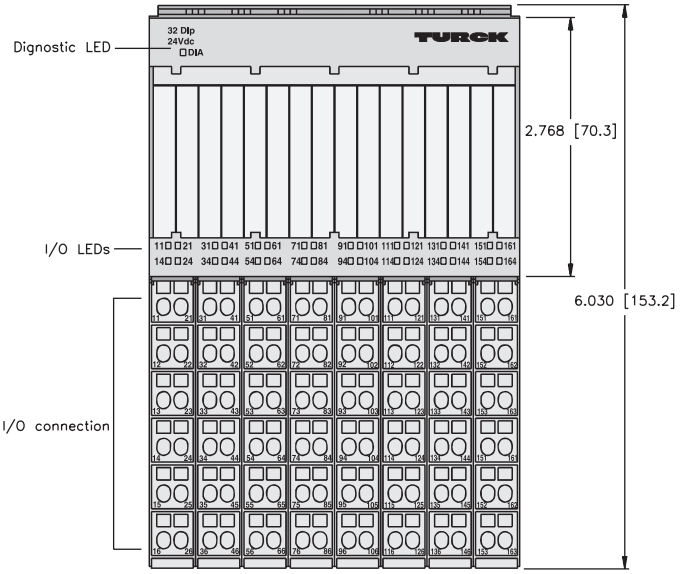
Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



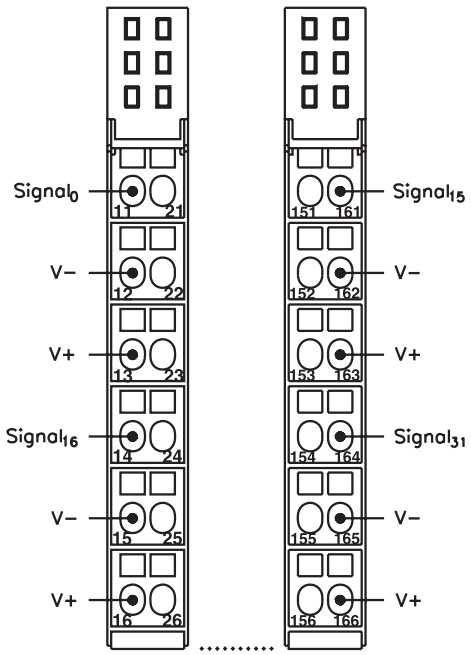


Part Number	Inputs: Input Count	Inputs: Pinout	Inputs: Style	Inputs: Group Diagnostics	Inputs: Individual Diagnostics	Inputs: Wire-Break Detection	Data: I/O Map
BL20-16DI-24VDC-P with BL20-B3*-SBB**	16	B20-B3A	PNP				1
BL20-32DI-24VDC-P with BL20-B6*-SBBSBB**	32	B20-B6A	PNP				2

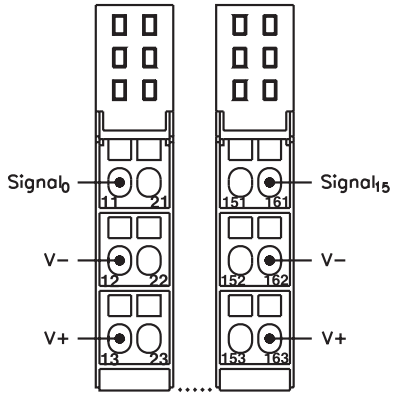
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-B6A



B20-B3A



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
	n+1	I-15	I-14	I-13	I-12	I-11	I-10	I-9	I-8
	n+2	(Data from modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
	n+1	I-15	I-14	I-13	I-12	I-11	I-10	I-9	I-8
	n+2	I-23	I-22	I-21	I-20	I-19	I-18	I-17	I-16
	n+3	I-31	I-30	I-29	I-28	I-27	I-26	I-25	I-24
	n+4	(Data from modules to the right)							

Discrete Output Blocks

BL20-32DO-24VDC-0.5A-P
BL20-16DO-24VDC-0.5A-P

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <120 mA from V_{MB}
  <50 mA from V_{IO}
- Output Current: <0.5 A per output (from V_{IO})

Power Distribution

- Outputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

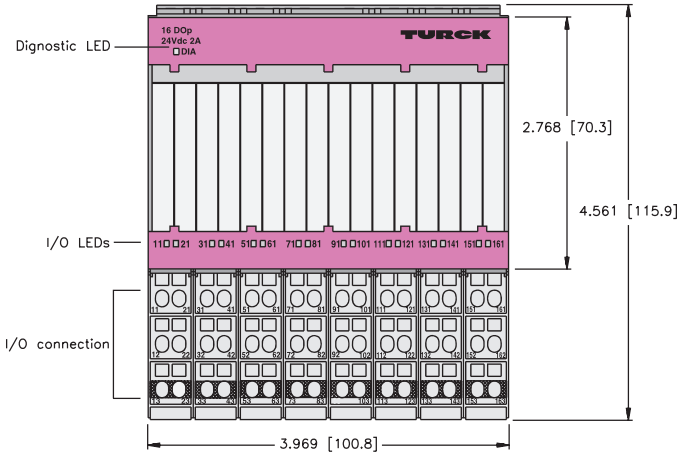
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

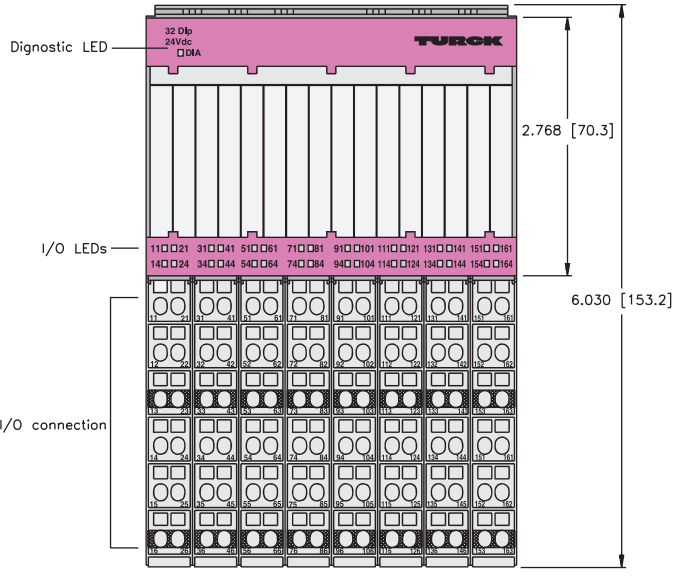
Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status



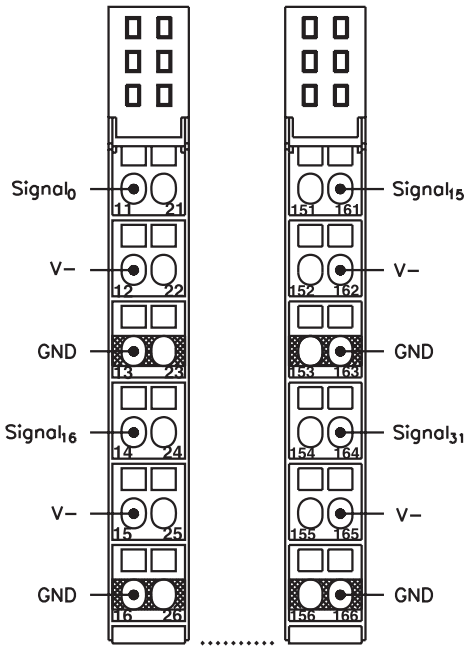


Part Number	Outputs: Output Count	Outputs: Pinout	Outputs: Current	Outputs: Individual Diagnostics	Outputs: Wire-Break Detection	Data: I/O Map
BL20-16DO-24VDC-0.5A-P with BL20-B3*-SBC**	16	B20-B3B	0.5 A			1
BL20-32DO-24VDC-0.5A-P with BL20-B6*-SBCSBC**	32	B20-B6B	0.5 A			2

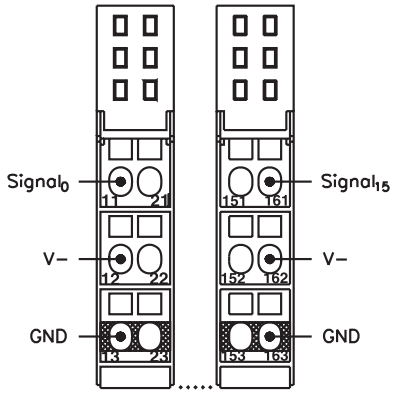
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Output Connectors

B20-B6B



B20-B3B



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	0-7	0-6	0-5	0-4	0-3	0-2	0-1	0-0
	n+1	0-15	0-14	0-13	0-12	0-11	0-10	0-9	0-8
	n+2	(Data for modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
out	n–1	(Data for modules to the left)							
	n	0-7	0-6	0-5	0-4	0-3	0-2	0-1	0-0
	n+1	0-15	0-14	0-13	0-12	0-11	0-10	0-9	0-8
	n+2	0-23	0-22	0-21	0-20	0-19	0-18	0-17	0-16
	n+3	0-31	0-30	0-29	0-28	0-27	0-26	0-25	0-24
	n+4	(Data for modules to the right)							

Analog Input Modules

BL20-2AI-U(-10/0 to +10VDC)
BL20-2AI-I(0/4 to 20MA)
BL20-1AI-U(-10/0 to +10VDC)
BL20-1AI-I(0/4 to 20MA)

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <41 mA from V_{MB} (...-1AI...)
  <35 mA from V_{MB} (...-2AI...)
  <50 mA from V_{IO} (...-1AI...)
  <12 mA from V_{IO} (...-2AI...)

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

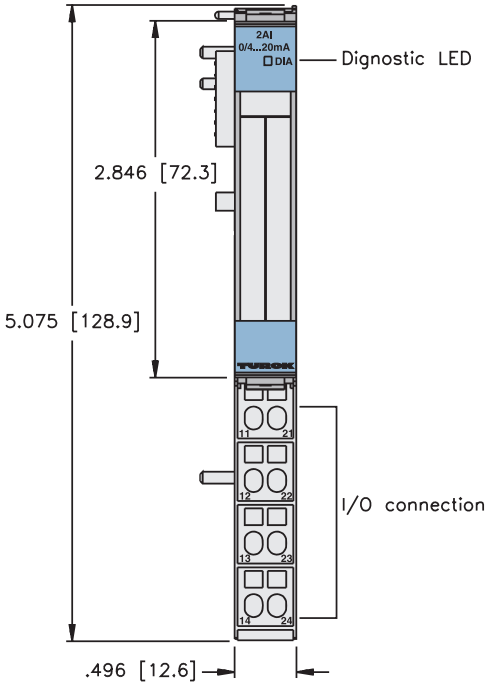
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics

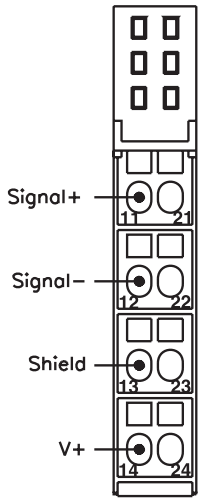


Part Number	Inputs: Input Count	Inputs: Pinout	Inputs: Style	Inputs: Group Diagnostics	Inputs: Individual Diagnostics	Inputs: Wire-Break Detection	Data: I/O Map
BL20-1AI-U(-10/0 to +10VDC) with BL20-S4*-SBBS**	1	B20-4D	-10/0 to 10 V				1
BL20-1AI-I(0/4 to 20MA) with BL20-S4*-SBBS**	1	B20-4D	0/4 to 20 mA				1
BL20-2AI-U(-10/0 to +10VDC) with BL20-S4*-SBBS**	2	B20-4E	-10/0 to 10 V				2
BL20-2AI-I(0/4 to 20MA) with BL20-S4*-SBBS**	2	B20-4E	0/4 to 20 mA				2

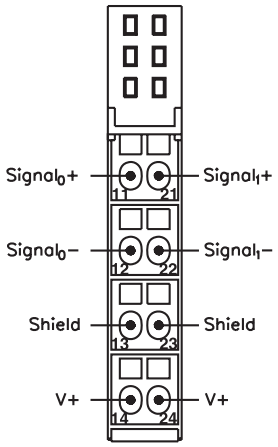
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-4D



B20-4E



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	(Data from modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	Channel 1, LSB							
	n+3	Channel 1, MSB							
	n+4	(Data from modules to the right)							

Analog Input Module

BL20-4AI-U/I

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Voltage and Current Inputs**

Electrical

- Operating Current: <50 mA from V_{MB}
  <20 mA from V_{IO} (...-2AI...)

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

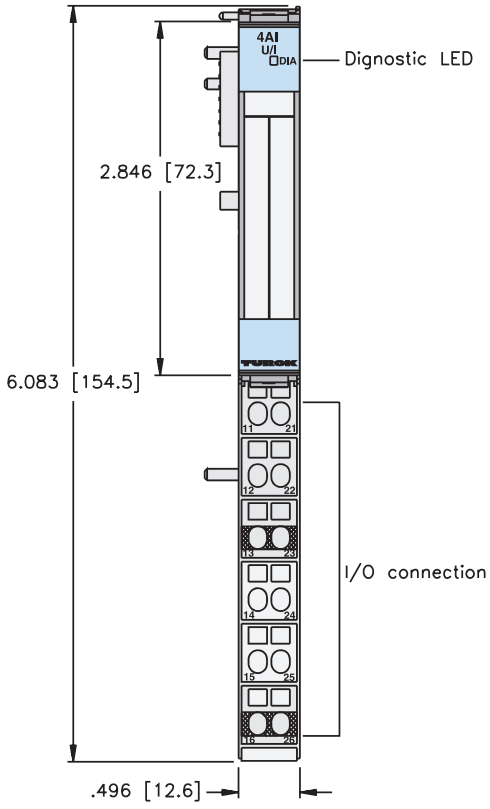
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection:IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics

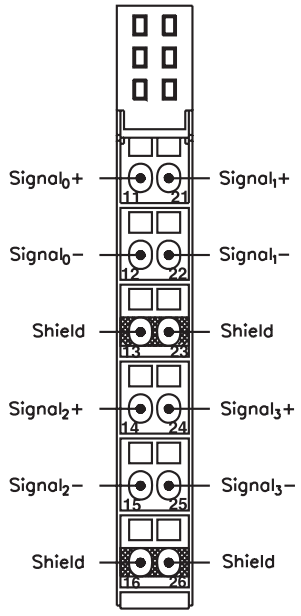


Part Number	Inputs: Input Count	Inputs: Pinout	Inputs: Style	Data: Group Diagnostics	Data: Individual Diagnostics	Data: Wire-Break Detection	Data: I/O Map
BL20-4AI-U/I with BL20-S6*-SBCSBC**	4	B20-6C	0/4 to 20 mA or -10/0 to 10V				1

* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-6C



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	Channel 1, LSB							
	n+3	Channel 1, MSB							
	n+4	Channel 2, LSB							
	n+5	Channel 2, MSB							
	n+6	Channel 3, LSB							
	n+7	Channel 3, MSB							
	n+8	(Data from modules to the right)							

Temperature Input Modules

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Thermocouple or RTD Inputs**

BL20-2AI-THERMO-PI
BL20-2AI-PT/NI-2/3

Electrical

- Operating Current: <45 mA from V_{MB}
  <30 mA from V_{IO}
- Thermocouple Types: B, E, J, K, N, R, S, T (... THERMO-PI)
- RTD Types: PT100, PT500, PT1000, Ni100, Ni1000 (...PT/Ni-2/3)

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

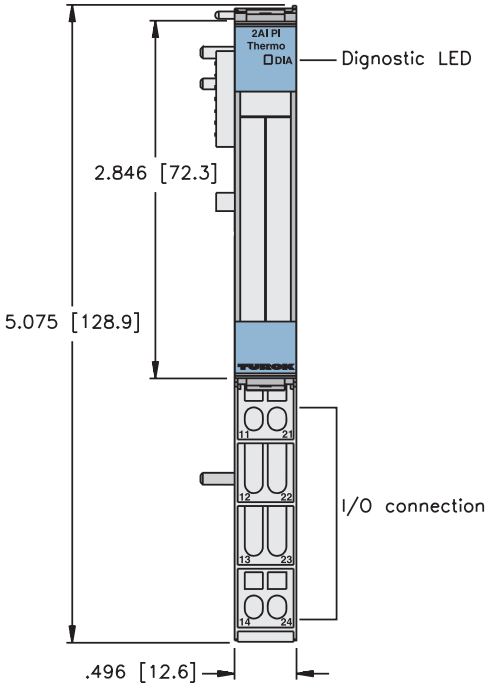
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics

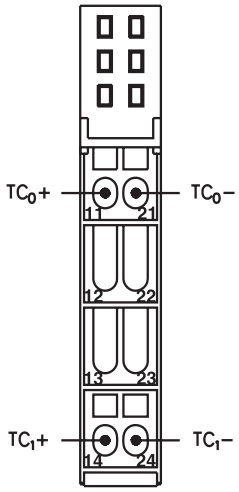


Part Number	Inputs: Input Count	Inputs: Pinout	Inputs: Style	Inputs: Group Diagnostics	Inputs: Individual Diagnostics	Inputs: Wire-Break Detection	Data: I/O Map
BL20-2AI-PT/NI-2/3 with BL20-S4*-SBBS**	2	B20-4F	RTD				1
BL20-2AI-THERMO-PI with BL20-S4*-SBBS-CJ**	2	B20-4G	TC				1

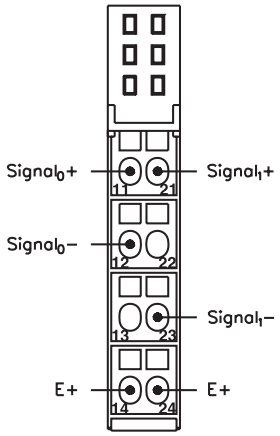
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.
Note: BL20-S4*-SBBS-CJ has integrated cold junction compensation fro thermocouples.

Input Connectors

B20-4G



B20-4F



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n–1	(Data from modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	Channel 1, LSB							
	n+3	Channel 1, MSB							
	n+4	(Data from modules to the right)							

Analog Output Modules

BL20-2AO-I(0/4 to 20MA)
BL20-2AO-U(-10/0 to +10VDC)
BL20-1AO-I(0/4 to 20MA)

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <43 mA (from V_{MB})
- Sensor Current: <50 mA (from V_{IO})

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

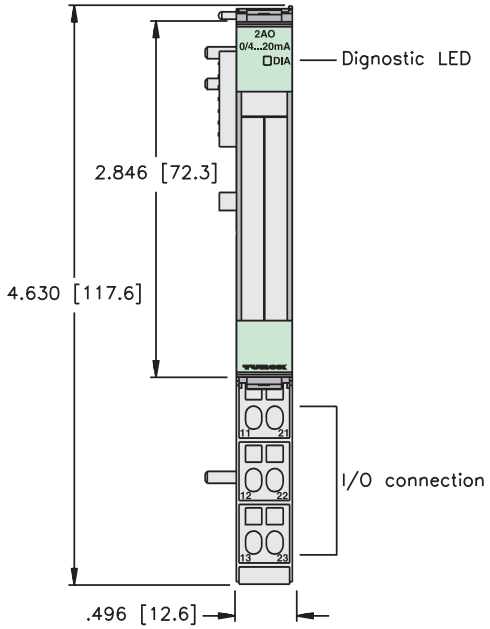
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics

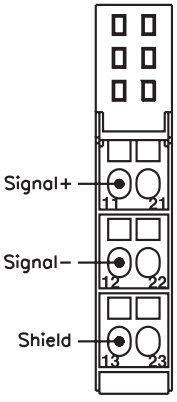


Part Number	Outputs: Output Count	Outputs: Pinout	Outputs: Style	Outputs: Group Diagnostics	Outputs: Individual Diagnostics	Outputs: Wire-Break Detection	Data: I/O Map
BL20-1AO-I(0/4 to 20MA) with BL20-S3*-SBB**	1	B20-3D	0/4 to 20 mA				1
BL20-2AO-I(0/4 to 20MA) with BL20-S3*-SBB**	1	B20-3E	0/4 to 20 mA				2
BL20-2AI-U(-10/0 to +10VDC) with BL20-S3*-SBB**	2	B20-3E	-10/0 to 10 V				2

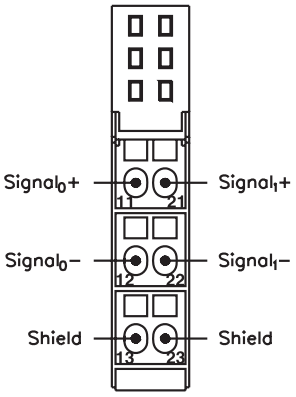
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Output Connectors

B20-3D



B20-3E



I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	(Data for modules to the right)							

I/O Data Map 2

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Out	n–1	(Data for modules to the left)							
	n	Channel 0, LSB							
	n+1	Channel 0, MSB							
	n+2	Channel 1, LSB							
	n+3	Channel 1, MSB							
	n+4	(Data for modules to the right)							

Serial I/O Modules

BL20-1RS232
BL20-1SSI
BL20-1RS485/422

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Various I/O Styles**

Electrical

- Operating Current: <25 mA from V_{IO}
  <140 mA from V_{MB} (...1RS232)
  <50 mA from V_{MB} (...1SSI)
  <60 mA from V_{MB} (...1RS485/422)

Power Distribution

- I/O: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

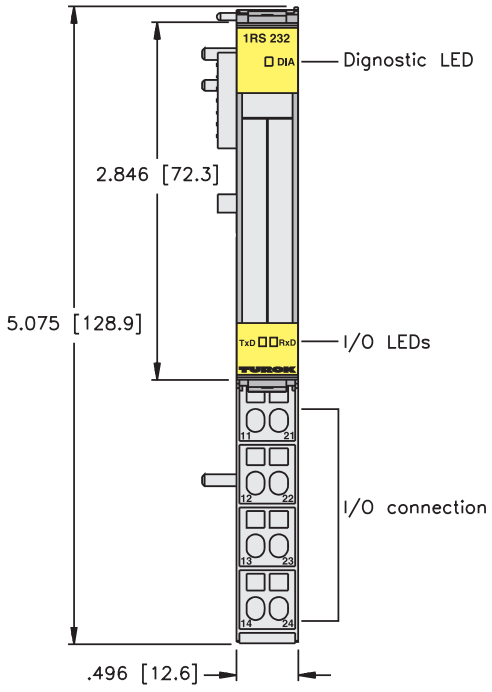
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

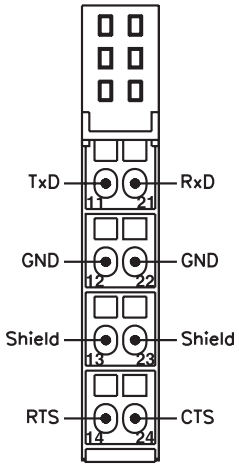


	Inputs						Outputs					Data
Part Number	Input Count	Pinout	Style	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	Output Count	Pinout	Style	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-1RS232 with BL20-S4*-SBBS**	1	B20-4H	RS232				1	B20-4H	RS232			#
BL20-1RS485/422 with BL20-S4*-SBBS**	1	B20-4I	RS485/422				1	B20-4I	RS485/422			#
BL20-1SSI with BL20-S4*-SBBS**	1	B20-4J	SSI				1	B20-4J	SSI			#

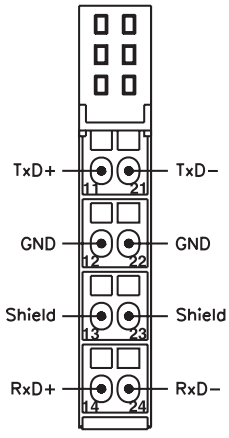
* T = Tension clamp
S = Screw clamp
** Base modules sold separately. See pages C58 - C61.
# I/O data map is dependant on the fieldbus being used. Consult the user manual for details.

Input/Output Connectors

B20-H4

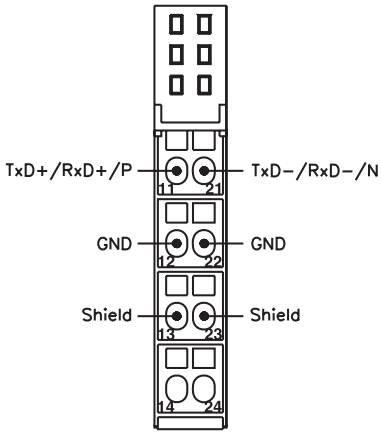


B20-4I



RS422

B20-4J



RS485

BL20

Counter Module

BL20-1CNT-24VDC

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Counter Input**

Electrical

- Operating Current: <50 mA (from V_{IO})
  <40 mA (from V_{MB})
- Count Range: 0...7FFFFFFF (positive)
  80000000...FFFFFFFF (negative)

Power Distribution

- Inputs: V_{IO}
- Logic: V_{MB} and V_{IO}

Mechanical

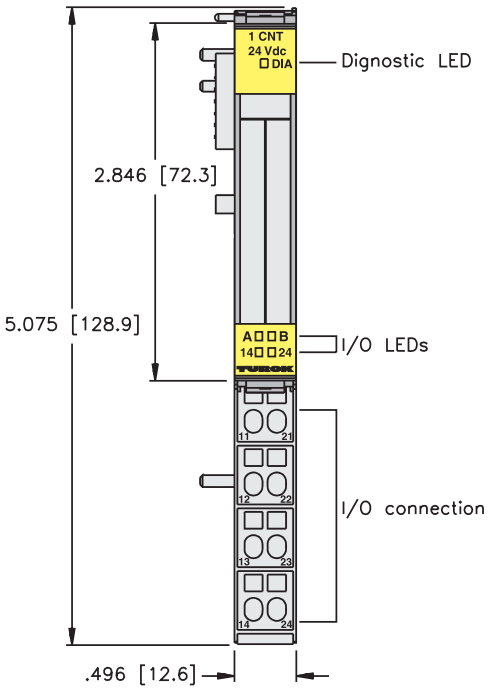
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

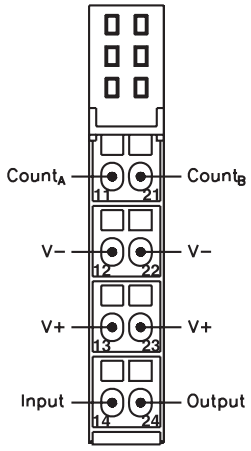


	Inputs						Data
Part Number	Input Count	Pinout	Style	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-1CNT-24VDC with BL20-S4*-SBBS**	1	B20-4K	Counter				See below

* T = Tension clamp
  S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-4K



NOTE: "Input" signal serves several uses (gate, sync, etc)

I/O data map is dependant on the fieldbus being used. Consult the user manual for details.

Power Feeding Modules

BL20-PF-120/230VAC-D
BL20-PF-24VDC-D

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**
- **Supply AC or DC I/O Power**

Electrical

- Operating Current: <28 mA (from V_{MB})
- Output Current: <10 A for downstream I/O

Power Distribution

- Accepts AC (...120/230VAC...) or DC (...24VDC...) supply to provide V_{IO} for downstream modules

Mechanical

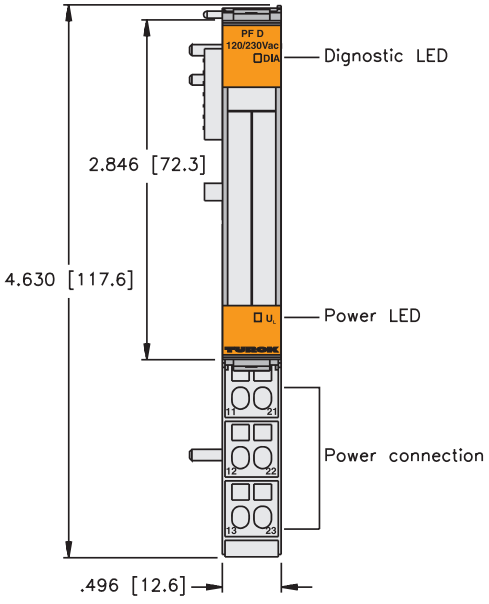
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

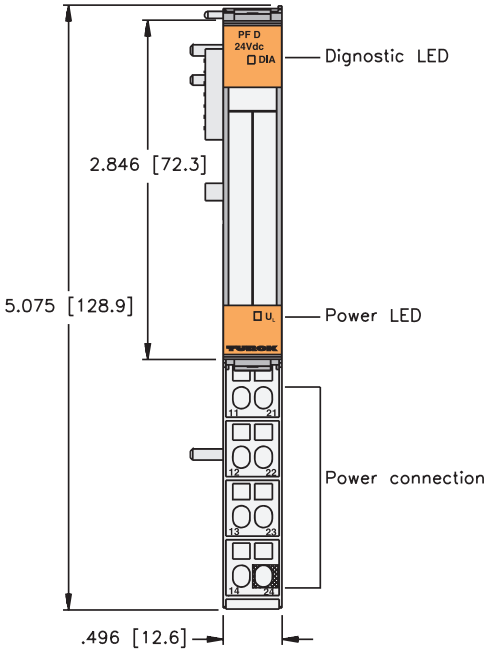
Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication and power supply status.



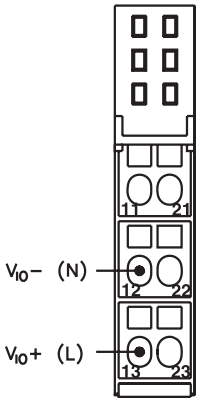


Part Number	Pinout
BL20-PF-120/230VAC-D with BL20-P3*-SBB**	B20-P3
BL20-PF-120/230VAC-D with BL20-P4*-SBBC**	B20-P4
BL20-PF-24VDC-D with BL20-P3*-SBB**	B20-P3
BL20-PF-24VDC-D with BL20-P4*-SBBC**	B20-P4

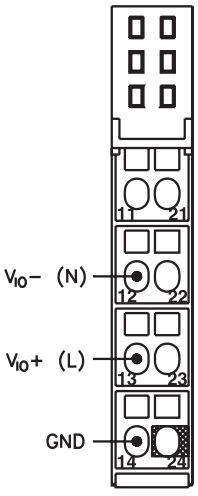
* T = Tension clamp
  S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-P3



B20-P4



Bus Refreshing Module

BL20-BR-24VDC-D

- **Modular I/O**
- **Fieldbus Independent Configuration**
- **IP 20 Protection**

Electrical

- Module Bus Supply: <1.5 A
- I/O Supply: <10 A (24 VDC only)

Power Distribution

- Refreshes backplane (V_{MB}) supply and provides new V_{IO} segment for downstream modules

Mechanical

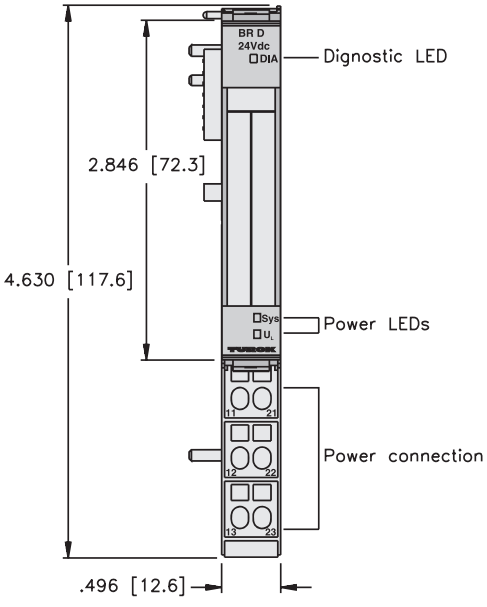
- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

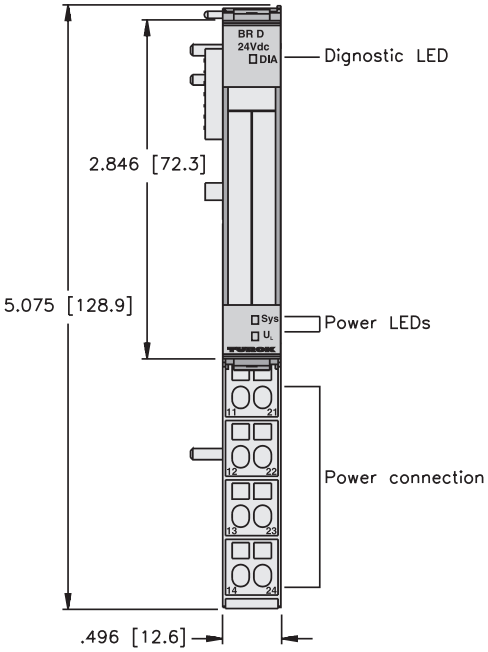
Diagnostics (Logical)

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LED to indicate module bus communication and power supply status.



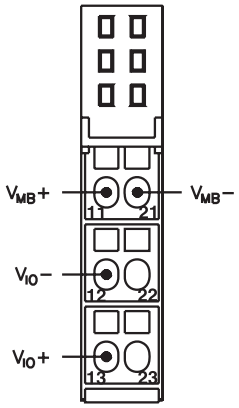


Part Number	Pinout
BL20-BR-24VDC-D with BL20-P3*-SBB-B**	B20-P3A
BL20-BR-24VDC-D with BL20-P4*-SBBC-B**	B20-P4A

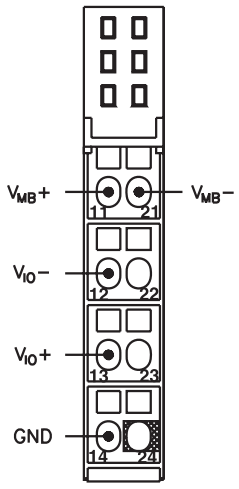
* T = Tension clamp
  S = Screw clamp
** Base modules sold separately. See pages C58 - C61.

Input Connectors

B20-P3A



B20-P4A



BL20 Motor Starter Modules

BL20 motor starters allow 3-phase motor control to be connected to the same BL20 rack as the standard I/O. BL20 motor starters can be mounted on the same rail as the BL20 gateway, or they can be mounted on another rail to ease placement within panels. The motor starters will be controlled by the gateways via the chosen fieldbus (DeviceNet, PROFIBUS-DP, or CANopen).

How to order a motor starter

PKZM0-1 +

PKZM0-XDM12 +

DILM7-10 (24 VDC) +

BL20-SWIRE-DIL =

How to implement the motor starters

Each SWIRE slice can manage up to 16 non-reversing motor starters.

Each gateway can support up to 3 SWIRE modules for a total of 48 non-reversing motor starters on a single gateway. Any reversing motor starter is considered as 2 non-reversing. The motor starters are rated for .06kW to 15kW (0.08hp to 20hp).

By ordering parts of the motor starter separately will allow for fewer parts to be stored within your inventory and will cost less to repair if just one piece of the motor starter fails. Motor starters are hot-swappable as long as the SWIRE-DIL module stays connected to the SWIRE system.

Refer to the user manual for details on installing and configuring the BL20 motor starter system.

Available Motor Starter Sizes

Part Number	Motor Rating @ 480 VAC		Rated Operational Current @ 480 VAC	Rated Uninterrupted Current @ 480 VAC	Classification Type
	kW	hp			
PKZM0-0.25	0.06	0.08	0.21	0.25	2
PKZM0-0.4	0.09	0.12	0.31	0.4	2
PKZM0-0.63	0.18	0.24	0.6	0.63	2
PKZM0-1	0.25	0.33	0.8	1	2
PKZM0-1.6	0.55	0.74	1.5	1.6	2
PKZM0-2.5	0.75	1	1.9	2.5	1
PKZM0-4	1.5	2	3.6	4	1
PKZM0-6.3	2.2	2.95	5	6.3	1
PKZM0-10	3	4	6.6	10	1
PKZM0-10*	4	5.4	8.5	10	1
PKZM0-12	5.5	7.38	11.3	12	1
PKZM0-16	7.5	10	15.2	16	1
PKZM0-25	11	15	21.7	25	1
PKZM0-32	15	20	29.3	32	1

*Can be achieved by using DILM9-10(24VDC) instead of the DILM7-10(24VDC)

Non-Reversing Part Numbers

hp	Motor Contactor Part Number	Wiring Set Part Number	Relay Part Number	SWIRE Communication
0.08	PKZM0-0.25	PKZM0-XDM12	DILM7-10(24 VDC)	BL20-SWIRE-DIL
0.12	PKZM0-0.4			
0.24	PKZM0-0.63			
0.33	PKZM0-1			
0.74	PKZM0-1.6			
1	PKZM0-2.5			
2	PKZM0-4			
2.95	PKZM0-6.3			
4	PKZM0-10			
5.4	PKZM0-10*		DILM9-10(24 VDC)	
7.38	PKZM0-12		DILM12-10(24 VDC)	
10	PKZM0-16		DILM15-10(24 VDC)	
15	PKZM0-25	PKZM0-XDM32	DILM25-10(24 VDC)	
20	PKZM0-32		DILM32-10(24 VDC)	

* To order a motor starter with the rated hp, order one of each part number that appears to the right.

Reversing Part Numbers

hp	Part Number	Wiring Set Number	Relay Part Number	Relay Part Number	SWIRE Communication	SWIRE Communication	Mechanical Interlock
0.08	PKZM0-0.25	PKZM0-XRM12	DILM7-10(24 VDC)	DILM7-10(24 VDC)	BL20-SWIRE-DIL	BL20-SWIRE-DIL	DILM12-XMV
0.12	PKZM0-0.4						
0.24	PKZM0-0.63						
0.33	PKZM0-1						
0.74	PKZM0-1.6						
1	PKZM0-2.5						
2	PKZM0-4						
2.95	PKZM0-6.3						
4	PKZM0-10						
5.4	PKZM0-10*		DILM9-10(24 VDC)	DILM9-10(24 VDC)			
7.38	PKZM0-12		DILM12-10(24 VDC)	DILM12-10(24 VDC)			
10	PKZM0-16		DILM15-10(24 VDC)	DILM15-10(24 VDC)			
15	PKZM0-25	PKZM0-XRM32	DILM25-10(24 VDC)	DILM25-10(24 VDC)			
20	PKZM0-32		DILM32-10(24 VDC)	DILM32-10(24 VDC)			

* To order a motor starter with the rated hp, order one of each part number that appears to the right.

SWIRE Economy Communication Module

BL20-E-1SWIRE

- **Modular Motor Starter Control**
- **Fieldbus Independant Configuration**
- **IP 20 Protection**
- **Base and Electronics in One Part**

Electrical

- Operating Current: ≤60 mA from V_{MB}
  <3 A from V_{IO}

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Diagnostics (Logical)

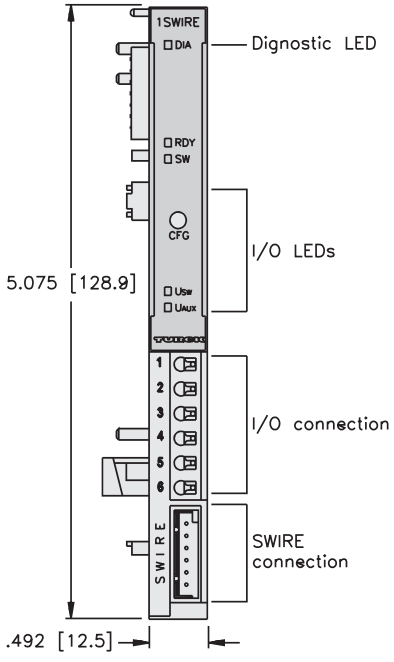
- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

- LEDs for status and I/O diagnostics

Supported Gateways

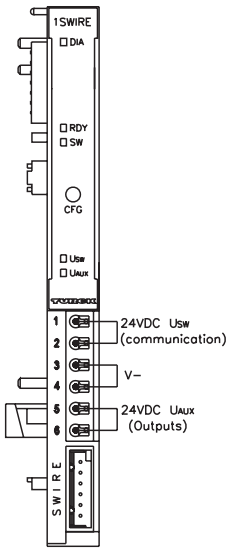
- BL20-GW-DPV1
- BL20-GWBR-CANopen
- BL20-GWBR-DNET



Part Number	Input Count	Pinout	Current	Group Diagnostics	Individual Diagnostics	Wire-Break Detection	I/O Map
BL20-E-1SWIRE		1	3 A	X	X		1

Note: This module can only be used with other tension clamp modules unless it is separated using a BL20-PF-24VDC-D and BL20-P4T-SBBC base.

1



Mating Cordsets:

From SWIRE slice to first motor starter: BL20-SWIRE-CAB-XXX.

End cap for last motor starter; BL20-SWIRE-CAB-000

From one motor starter to an adjacent motor starter: BL20-SWIRE-CAB-008

XXX = Cable length in cm, cable lengths available in 25, 50, 100 and 200 cm.

I/O Data Map 1

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
In	n-1	(Data from modules to the left)							
	n	SWIRE Slave 2				SWIRE Slave 1			
		SD2		PKZ-ST2	SI2	SD1		PKZ-ST1	SI1
	n+1	SWIRE Slave 4				SWIRE Slave 3			
		SD4		PKZ-ST2	SI2	SD3		PKZ-ST3	SI3
	n+2	SWIRE Slave 6				SWIRE Slave 5			
		SD6		PKZ-ST2	SI2	SD5		PKZ-ST5	SI5
	n+3	SWIRE Slave 8				SWIRE Slave 7			
		SD8		PKZ-ST2	SI2	SD7		PKZ-ST7	SI7
	n+4	SWIRE Slave 10				SWIRE Slave 9			
		SD10		PKZ-ST2	SI2	SD9		PKZ-ST9	SI9
	n+5	SWIRE Slave 12				SWIRE Slave 11			
		SD12		PKZ-ST2	SI2	SD11		PKZ-ST11	SI11
	n+6	SWIRE Slave 14				SWIRE Slave 13			
		SD14		PKZ-ST2	SI2	SD13		PKZ-ST13	SI13
	n+7	SWIRE Slave 16				SWIRE Slave 15			
		SD16		PKZ-ST2	SI2	SD15		PKZ-ST15	SI15
	n+8	(Data from modules to the right)							

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OUT	n-1	(Data from modules to the left)							
	n	SWIRE Slave 2				SWIRE Slave 1			
					SO2				SO1
	n+1	SWIRE Slave 4				SWIRE Slave 3			
					SO4				SO3
	n+2	SWIRE Slave 6				SWIRE Slave 5			
					SO6				SO5
	n+3	SWIRE Slave 8				SWIRE Slave 7			
					SO8				SO7
	n+4	SWIRE Slave 10				SWIRE Slave 9			
					SO10				SO9
	n+5	SWIRE Slave 12				SWIRE Slave 11			
					SO12				SO11
	n+6	SWIRE Slave 14				SWIRE Slave 13			
					SO14				SO13
	n+7	SWIRE Slave 16				SWIRE Slave 15			
					SO16				SO15
	n+8	(Data from modules to the right)							

SIx: Motor Starter is On
PKZ-STx: Motor Starter is OK
SDx:Slave Diagnostics Available

SOx: Turn on Motor Starter

Motor Overload Contactor

- **Protects Motor from Current Overload**

Housing	Part Number	Application
	PKZM0-*	• Available in multiple amperages • See table on page C50 for Specs.

Motor Starter Wiring Set

- **Wires Motor Overload Contactor to Relay Module**

Housing	Part Number	Application
	PKZM0-X*M*2	• Different styles for different amperages • See tables on C51 & C52 for correct part numbers

Relay Module

- **Controls whether or not Power is Supplied to Connected Motor**

Housing	Part Number	Application
	DILM*	• Available in different styles for different amperages • See pages C51 & C52 for correct part numbers • "10" in part number refers to normally open contact • "01" in part number refers to normally closed contact

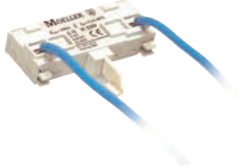
SWIRE Communication

- **Controls SWIRE Communication and Activates the Motor Starter**

Housing	Part Number	Application
	BL20-SWIRE-DIL	• Use with all DILM* modules • Control motor starter through SWIRE network

Trip Indication

- **Provide Feedback Status of Motor Starter because of Overcurrent or Short Circuit**

Housing	Part Number	Application
	**NHI-E-10L-PL20**	• Monitor motor starter status

Bus Commoning Bars

- **Easily Connect Multiple Motor Starters without the need for Separate Wiring**

Housing	Part Number	Application
	BK25/3-PKZ0 **B3.0/2-PKZ0*** **B3.0/4-PKZ0*** **B3.0/5-PKZ0***	• BK25 is used to land 3 phase wires to beginning of the bus • B3.0/x; x refers to the number of motor starters can be connected to the bar • Max 63A can be carried through a bus bar

* If bussing a reverse motor starter, a cover may be necessary for finger safe needs. Order a cap with p/n H-B3-PKZ0.

Power Feed Module

- **Safety Zone Separation**

Housing	Part Number	Application
	BL20-SWIRE-PF	• Separate motor starter sets into separate safety zones

Base Modules for Slice I/O

Housing	Part Number	Description
Three Terminal Block	**BL20-S3T-SBB**	Tension Clamp Connection
	BL20-S3S-SBB	Screw Terminal Connection
Three Terminal Block with C-Connection	**BL20-S3T-SBC**	Tension Clamp Connection
	BL20-S3S-SBC	Screw Terminal Connection
Four Terminals	**BL20-S4T-SBBS**	Tension Clamp Connection
	BL20-S4S-SBBS	Screw Terminal Connection
Four Terminals with Cold Junction Compensation for Thermocouples	**BL20-S4T-SBBS-CJ**	Tension Clamp Connection
	BL20-S4S-SBBS-CJ	Screw Terminal Connection

Base Modules for Slice I/O

Housing	Part Number	Description
Four Terminals with C-Connection	**BL20-S4T-SBBC**	Tension Clamp Connection
	BL20-S4S-SBBC	Screw Terminal Connection
Four Terminals with C-Connection, Dual Signal	**BL20-S4T-SBCS**	Tension Clamp Connection
	BL20-S4S-SBCS	Screw Terminal Connection
Six Terminals	**BL20-S6T-SBBSBB**	Tension Clamp Connection
	BL20-S6S-SBBSBB	Screw Terminal Connection
Six Terminals with C-Connection	**BL20-S6T-SBCSBC**	Tension Clamp Connection
	BL20-S6S-SBCSBC	Screw Terminal Connection

Base Modules for Block I/O

Housing	Part Number	Description
Three Terminal Block	**BL20-B3T-SBB**	Tension Clamp Connection
	BL20-B3S-SBB	Screw Terminal Connection
Three Terminal Block with C-Connection	**BL20-B3T-SBC**	Tension Clamp Connection
	BL20-B3S-SBC	Screw Terminal Connection
Four Terminal Block with C-Connections	**BL20-B4T-SBBC**	Tension Clamp Connection
	BL20-B4S-SBBC	Screw Terminal Connection
Six Terminal Block	**BL20-B6T-SBBSBB**	Tension Clamp Connection
	BL20-B6S-SBBSBB	Screw Terminal Connection

Base Modules for Block I/O

Housing	Part Number	Description
Six Terminal Block with C-Connection	**B6T-SBCSBC**	Tension Clamp Connection
	B6S-SBCSBC	Screw Terminal Connection

Base Modules for Power Input

Housing	Part Number	Description
Three Terminal Power Base	**BL20-P3T-SBB**	Tension Clamp Connection
	BL20-P3S-SBB	Screw Terminal Connection
Three Terminal Power Base with Gateway Feed	**BL20-P3T-SBB-B**	Tension Clamp Connection
	BL20-P3S-SBB-B	Screw Terminal Connection
Four Terminal Power Base with C-Connection	**BL20-P4T-SBBC**	Tension Clamp Connection
	BL20-P4S-SBBC	Screw Terminal Connection
Four Terminal Power Base with C-Connection and Gateway Feed	**BL20-P4T-SBBC-B**	Tension Clamp Connection
	BL20-P4S-SBBC-B	Screw Terminal Connection

Housing	Part Number	Description
Markers Used for color coding terminals on BL20 base modules 	XN-ANBZ-WS (10/PKG) XN-ANBZ-GN/GE/BED (10/PKG) XN-ANBZ-RT/BL-BED (10/PKG) XN-ANBZ-BR (10/PKG) XN-ANBZ-SW (10/PKG) XN-ANBZ-GN (10/PKG) XN-ANBZ-RT (10/PKG) XN-ANBZ-BL (10/PKG)	White Green/Yellow Red/Blue Brown Black Green Red Blue
Jumpers For use with BL20 relay modules 	XN-QV/8 (10/PKG) XN-QV/7 (10/PKG) XN-QV/6 (10/PKG) XN-QV/5 (10/PKG) XN-QV/4 (10/PKG) XN-QV/3 (10/PKG) XN-QV/2 (10/PKG) XN-QV/1 (10/PKG)	8 pair 7 pair 6 pair 5 pair 4 pair 3 pair 2 pair 1 pair
Coding Blocks For keying electronic modules to base modules 	XN-KO/17 (10/PKG) XN-KO/16 (10/PKG) XN-KO/14 (10/PKG) XN-KO/13 (10/PKG) XN-KO/12 (10/PKG) XN-KO/11 (10/PKG) XN-KO/10 (10/PKG) XN-KO/9 (10/PKG) XN-KO/8 (10/PKG) XN-KO/6 (10/PKG) XN-KO/2 (10/PKG)	BL20-PF-120/230VAC-D BL20-PF-24VDC-D BL20-2AO-U(-10/0...+10V) BL20-1AO-I(0/4...20MA) RTD and TC temperature modules, BL20-1AI-U(-10/0...+10V) BL20-1AI-I(0/4...20MA) BL20-2DO-R-CO BL20-2DO-R-NC BL20-2DO-R-NO BL20-*DO-24VDC* BL20-*DI-24VDC*

Housing	Part Number	Description
Labels	FW5/151-200 (10 SETS/PKG) FW5/101-150 (10 SETS/PKG) FW5/51-100 (10 SETS/PKG) FW5/1-50 (10 SETS/PKG)	Numbered 151-200 Numbered 101-150 Numbered 51-100 Numbered 1-50
End Bracket	XN-WEW-35/2-SW (1/PKG)	
End Plate	XN-ABPL	
Shield Connection - For use with analog modules	XN-KLBU/S (10/PKG) XN-KLBU/T (10/PKG)	Screw terminal Tension clamp
Labels - For labeling electronic modules. DIN A5 sheets	BL20-LABEL/BLOCK (5 SHEETS/PKG) BL20-LABEL/SCHEIBE (5 SHEETS/PKG)	For block modules For slice modules
Tension Clamp Tool - For ease of operating tension clamp connections	ZBW5-2	
Ferrite Ring - For damping high frequency inteference on data and supply lines	PS416-ZBX-405 (2/PKG)	
Shield Connection - For use with direct wiring gateways	SCH-1-WINBLOC (1/PKG)	
Programming Cable - For connecting the BL20/BL67 system to the I/O Assistant software	XN-PS2-CABLE	